

# **Potentiometric Surface Map of the Unconsolidated Aquifers of Madison County, Indiana**

by  
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February 2014

Madison County, Indiana is located in the north-central section of the state and lies primarily within the White and West Fork White River Basin; however, the northern portion lies within the Upper Wabash River Basin and the southeastern section lies within the East Fork White River Basin.

The Potentiometric Surface Map (PSM) of the unconsolidated aquifers of Madison County was mapped by contouring the elevations of 2881 static water-levels reported on well records received primarily over a 50 year period. These wells are completed in aquifers at various depths, and typically, under confined conditions (bounded by impermeable layers above and below the water bearing formation). However, some wells were completed under unconfined (not bounded by impermeable layers) settings. The mapped potentiometric surface contours are primarily for the upper 100 feet of the unconsolidated materials and utilize data for wells 100 feet or less in depth. If the shallow data was sparse or unavailable in an area, deeper wells were used to complement the mapping.

The potentiometric surface is a measure of the pressure on water in a water bearing formation. Water in an unconfined aquifer is at atmospheric pressure and will not rise in a well above the top of the aquifer, in contrast to groundwater in a confined aquifer which is under hydrostatic pressure and will rise in a well above the top of the water bearing formation.

Static water-level measurements in individual wells used to construct county PSM's are indicative of the water-level at the time of well completion. The groundwater level within an aquifer constantly fluctuates in response to rainfall, evapotranspiration, groundwater movement and pumpage. Therefore, measured static water-levels in an area may differ due to local or seasonal variations. Because fluctuations in groundwater are typically small, static water-levels

can be used to construct a generalized PSM. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams.

Universal Transverse Mercator (UTM) coordinates for the water wells were either physically obtained in the field, determined through address geocoding, or reported on water well records. The location of the majority of the water well records used to make the PSM were field verified. Elevation data were obtained from a digital elevation model. Quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

Potentiometric surface elevations range from a high of 980 feet mean sea level (msl) in the southeastern corner of the county, to a low of 790 feet msl in the west-central section. Groundwater flow direction throughout the majority of the county is generally to the west-southwest towards Pipe Creek and the White River, with a subcomponent flowing to the southwest toward Fall Creek. However, in the northeastern portion of the county, approximately north of the boundary between the White and West Fork White River, and Upper Wabash River Basins, groundwater flow is to the north. In portions of the county, where data is lacking and/or covered by thin or unproductive deposits, potentiometric surface elevation contours have not been extended through these areas.

The county PSM can be used to define the regional groundwater flow path and to identify significant areas of groundwater recharge and discharge. County PSM's represent overall regional characteristics and are not intended to be a substitute for site-specific studies.